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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/686,115	10/11/2000	Charu C. Aggarwal	YOR920000429US1	4940

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EXAMINER
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BOOKER, KELVIN E

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 03/08/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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## Office Action Summary

Application No.

09/686,115

Applicant(s)

AGGARWAL ET AL.

Examiner

Kelvin E Booker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-13, 16-23 and 26-30 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 14, 15, 24 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Detailed Office Action.

## **DETAILED ACTION**

### ***Response to Amendment***

1. In The Request for Reconsideration, filed January 2, 2004 (see paper no. 7), the applicant addresses perspective issues that potentially differentiate the intended invention from the cited art. **Claims 1-30** are presented for further consideration.

### ***Response to Arguments***

2. Applicant's arguments filed January 2, 2004 have been fully considered but they are not persuasive.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. **Claims 1-3, 6-9, 11-13, 16-19, 21-23 and 26-29** are rejected under 35 U.S.C. 102(a) as being anticipated by Knorr et al., “Distance-Based Outliers: Algorithms and Applications” [hereafter Knorr].

**As per claim 1**, Knorr teaches of a method of detecting one or more outliers in a data set, comprising the steps of:

A. determining one or more sets of dimensions and corresponding ranges in the data set which are sparse in density (see the *Abstract*; and section 3.1: *Index-based algorithms*, especially paragraphs one and two: “Let N be...as an outlier”); and

B. determining one or more data points in the data set which contain these sets of dimensions and corresponding ranges, the one or more data points being identified as the one or more outliers in the data set (see section 3.1: *Index-based algorithms*, especially paragraph two: “From the formulation...as an outlier”).

As per claim 2, Knorr teaches of a method wherein a range is defined as a set of contiguous values on a given dimension (see section 3.1: *Index-based algorithms*, especially paragraphs one and two; and section 4.4: *Generalization to higher dimensions*, especially paragraph one: “When moving from...Properties 1 and 2”).

As per claim 3, Knorr teaches of a method wherein the sets of dimensions and corresponding ranges in which the data is sparse in density is quantified by a sparsity coefficient measure (see section 4.4: *Generalization to higher dimensions*, especially paragraph two: “However to preserve...kD cell structure”).

As per claim 6, Knorr teaches of a method wherein a set of dimensions is determined using an algorithm which uses the processes of solution recombination, selection and mutation over a population of multiple solutions (see section 3.1: *Index-based algorithms*, especially paragraph three: determining outliers with regards to multiple dimensions).

As per claim 7, Knorr teaches of a method wherein the process of solution recombination comprises combining characteristics of two solutions in order to create two new

solutions (see section 3.2: *A nested-loop algorithm*, especially paragraph one: “To avoid the cost...D-neighbors exceeds M”).

**As per claim 8**, Knorr teaches of a method wherein the process of mutation comprises changing a particular characteristic of a solution in order to result in a new solution (see 4.4: *Generalization to higher dimensions*, especially paragraph two: “However to preserve...*k*D cell structure”).

**As per claim 9**, Knorr teaches of a method wherein the process of selection comprises biasing the population in order to favor solutions which are more optimum (see 4.4: *Generalization to higher dimensions*, especially paragraph two: “However to preserve...*k*D cell structure”).

**As per claims 11-13 and 16-19**, the same limitations are subjected to in claims 1-3 and 6-10, respectively, therefore the same rejections apply (see claims 1-3 and 6-10 above).

**As per claims 21-23 and 26-29**, the same limitations are subjected to in claims 1-3 and 6-10, respectively, therefore the same rejections apply (see claims 1-3 and 6-10 above).

5. **Claims 10, 20 and 30** are rejected under 35 U.S.C. 102(a) as being anticipated by Sheikholeslami et al., “WaveCluster: a wavelet-based clustering approach for spatial data in very large databases” [hereafter Sheikholeslami].

**As per claim 10**, Sheikholeslami teaches of a method of detecting one or more outliers in a data set, comprising the steps of:

A. identifying and mining one or more patterns in the data set which have abnormally low presence not due to randomness (see section 1: *Introduction*, especially page 289, paragraph three: “The aim of data-clustering...during the mining process); and

B. identifying one or more records which have the one or more patterns present in them as the one or more outliers (see section 6: Performance Evaluation, especially page 299, section *Handling noise objects*: “WaveClustering is very effective...the one without noise”).

**As per claims 20 and 30**, the same limitations are subjected to in claim 10, therefore the same rejections apply (see claim 10 above).

6. In the remarks, Applicants argue in substance that the cited Knorr reference, fail to address:  
(1) *high dimensionality aspect of outlier detection, involving dimensionalities of 100 or 200*; and  
(2) *the identification of data points in the sets of dimensions and ranges as outliers*.

The applicant continues the argument in noting that the Sheikholeslami reference fails to disclose  
(3) *the identification of patterns in the data set which have abnormally low presence not due to randomness*; and (4) *the identification of records as outliers that have patterns present*.

7. In response to the Applicant’s arguments, the Examiner respectfully disagrees.

In response to applicant's argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., (1) *high dimensionality aspect of outlier detection, involving dimensionalities of 100 or 200*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification,

limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As per (2) *the identification of data points in the sets of dimensions and ranges as outliers*, Knorr clearly teaches of identifying data in sets of dimensions and ranges in section 3.1 (see claim 1 above and prior Office Action), wherein Knorr examines the distance between objects within a k-dimensional dataset, whereby outliers are determined when analyzing a range query centered on the objects.

As per (3) *the identification of patterns in the data set which have abnormally low presence not due to randomness*; and (4) *the identification of records as outliers that have patterns present*, Sheikholeslami focuses on the identifying subclass patterns within spatial databases and outliers respective of the determined patterns (see claim 1 above and prior office action).

#### ***Allowable Subject Matter***

8. **Claims 4, 5, 14, 15, 24 and 25** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

the cited prior art fails to explicitly teach of a method and means for detecting one or more outliers in a data set inclusive of the limitations of claims 1 and 3 [respective of claims 4 and 5 above], claims 11 and 13 [respective of claims 14 and 15 above] and claims 21 and 23

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[respective of claims 24 and 25 above] consistent with the limitations of the aforementioned claims 4, 5, 14, 15, 24 and 25, wherein the sparsity coefficient measure (S(D)) is defined as  $[(n(D)-(N*f^k))/(N*f^k*(1-f^k))^{1/2}]$ , whereby S(D) is inversely proportional to the number of data points in a given set of dimensions and corresponding ranges.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

11. An inquiry concerning this communication or earlier communications from the examiner should be directed to Kelvin Booker whose telephone number is (703) 308-4088. The examiner can normally be reached on Monday-Friday from 7:00 AM-5:30 PM EST.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri, can be reached on (703) 305-0282. The fax number for the organization where this application or proceeding is assigned is (703) 746-7239.

An inquiry of a general nature or relating to the status of this application proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

**K.E.B.**

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**March 4, 2004**

*Ramesh Patel*  
RAMESH PATEL  
PRIMARY EXAMINER 3/5/04  
*For Anil Khatri*